



## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2022-0467; Project Identifier AD-2022-00174-E]**

**RIN 2120-AA64**

#### **Airworthiness Directives; General Electric Company Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The FAA proposes to adopt a new airworthiness directive (AD) for certain General Electric Company (GE) GEnx-1B and GEnx-2B model turbofan engines. This proposed AD was prompted by the detection of melt-related freckles in the forgings and billets, which may reduce the life of certain compressor discharge pressure (CDP) seals, interstage seals, high-pressure turbine (HPT) rotor stage 2 disks, and stages 6-10 compressor rotor spools. This proposed AD would require revising the airworthiness limitations section (ALS) of the applicable GEnx-1B and GEnx-2B Engine Manual (EM) and the operator's existing approved maintenance program or inspection program, as applicable, to incorporate reduced life limits for these parts. The FAA is proposing this AD to address the unsafe condition on these products.

**DATES:** The FAA must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <https://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: (202) 493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this NPRM, contact General Electric Company, 1 Neumann Way, Cincinnati, OH, 45215; phone: (513) 552-3272; email: [aviation.fleetsupport@ae.ge.com](mailto:aviation.fleetsupport@ae.ge.com); website: <https://www.ge.com>. You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

### **Examining the AD Docket**

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0467; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

**FOR FURTHER INFORMATION CONTACT:** Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7178; email: [Alexei.T.Marqueen@faa.gov](mailto:Alexei.T.Marqueen@faa.gov).

### **SUPPLEMENTARY INFORMATION:**

#### **Comments Invited**

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include “Docket No. FAA-2022-0467; Project Identifier AD-2022-00174-E” at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to <https://www.regulations.gov>, including any

personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

### **Confidential Business Information**

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

### **Background**

The FAA was notified by the engine manufacturer of the detection of melt-related freckles in the forgings and billets, which may reduce the life of certain CDP seals, interstage seals, HPT rotor stage 2 disks, and stages 6-10 compressor rotor spools (life-limited parts (LLPs)) on GEnx-1B54/P2, GEnx-1B58/P2, GEnx-1B64/P2, GEnx-1B67/P2, GEnx-1B70/P2, GEnx-1B70C/P2, GEnx-1B70/72/P2, GEnx-1B70/75/P2, GEnx-1B74/75/P2, GEnx-1B75/P2, GEnx-1B76/P2, GEnx-1B76A/P2, and GEnx-1B78/P2 (GEnx-1B) and GEnx-2B67, GEnx-2B67B, and GEnx-2B67/P (GEnx-2B) model turbofan engines. The manufacturer’s investigation determined that, as a result of such freckles forming in the forgings and billets, certain LLPs may have undetected subsurface anomalies that developed during the manufacturing process, resulting in reduced material properties and a lower fatigue life capability. Reduced material properties may cause premature LLP fracture, which could result in uncontained debris release. As a result of its investigation, the manufacturer determined the need to reduce the life limits of certain LLPs. To reflect these reduced life limits, the manufacturer

revised the ALS of the affected GEnx-1B and GEnx-2B EMs. The FAA is proposing to require operators to update the ALS of the applicable GEnx-1B and GEnx-2B EM with the reduced life limits for certain LLPs. This condition, if not addressed, could result in uncontained debris release, damage to the engine, and damage to the airplane.

#### **FAA’s Determination**

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

#### **Related Service Information**

The FAA reviewed GE GEnx-1B Service Bulletin (SB) 72-0484 R00, dated August 11, 2021, and GE GEnx-2B SB 72-0423 R00, dated August 11, 2021. These SBs, differentiated by engine model, provide the reduced life limits for certain LLPs.

#### **Proposed AD Requirements in this NPRM**

This proposed AD would require revising the ALS of the applicable GEnx-1B and GEnx-2B EM and the operator’s existing approved maintenance program or inspection program, as applicable, to incorporate reduced life limits for certain LLPs.

#### **Differences Between this Proposed AD and the Service Information**

GE GEnx-2B Service Bulletin (SB) 72-0423 R00, dated August 11, 2021, uses the term “HPT stage 2 disk” to describe HPT stage 2 disk P/N 2383M86P02, while this proposed AD uses the term “HPT rotor stage 2 disk.”

#### **Costs of Compliance**

The FAA estimates that this AD, if adopted as proposed, would affect 390 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this proposed AD:

##### **Estimated costs**

<b>Action</b>	<b>Labor Cost</b>	<b>Parts Cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Revise ALS of EM and the operator’s existing approved	1 work-hour x \$85 per hour = \$85	\$0	\$85	\$33,150

maintenance or inspection program				
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### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA’s authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency’s authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Would not affect intrastate aviation in Alaska, and
- (3) Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **The Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

## **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

**General Electric Company:** Docket No. FAA-2022-0467; Project Identifier AD-2022-00174-E.

#### **(a) Comments Due Date**

The FAA must receive comments on this airworthiness directive (AD) by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

None.

#### **(c) Applicability**

This AD applies to General Electric Company (GE) GEnx-1B54/P2, GEnx-1B58/P2, GEnx-1B64/P2, GEnx-1B67/P2, GEnx-1B70/P2, GEnx-1B70C/P2, GEnx-1B70/72/P2, GEnx-1B70/75/P2, GEnx-1B74/75/P2, GEnx-1B75/P2, GEnx-1B76/P2, GEnx-1B76A/P2, GEnx-1B78/P2, GEnx-2B67, GEnx-2B67B, and GEnx-2B67/P model turbofan engines.

#### **(d) Subject**

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section, and JASC Code 7250, Turbine Section.

#### **(e) Unsafe Condition**

This AD was prompted by the detection of melt-related freckles in the forgings and billets, which may reduce the life of certain compressor discharge pressure (CDP) seals, interstage seals, high-pressure turbine (HPT) rotor stage 2 disks, and stages 6-10 compressor rotor spools. The FAA is issuing this AD to prevent failure of the CDP seal, interstage seal, HPT rotor stage 2 disk, and stages 6-10 compressor rotor spool. The unsafe condition, if not addressed, could result in uncontained debris release, damage to the engine, and damage to the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Required Actions**

(1) For all affected GENx-1B model turbofan engines, within 90 days after the effective date of this AD, revise the airworthiness limitations section (ALS) of the existing GENx-1B Engine Manual (EM) and the operator's existing approved maintenance program or inspection program, as applicable, by inserting the following information into the applicable table for their respective part numbers:

(i) For stages 6-10 compressor rotor spool part number (P/N) 2628M56G01, insert the information in Table 1 to paragraph (g)(1)(i) of this AD.

**Table 1 to Paragraph (g)(1)(i) – Stages 6-10 Compressor Rotor Spool P/N 2628M56G01**

Part Name	Part Number	Life Cycles	Life Cycles	Life Cycles	Life Cycles	Life Cycles	Life Cycles	Life Cycles
		-1B54/P2	-1B58/P2 -1B64/P2 -1B67/P2 -1B70/P2	-1B70C/P2	-1B70/72/P2 -1B70/75/P2 -1B74/75/P2 -1B75/P2	-1B76/P2	-1B76A/P2	-1B78/P2
Spool, Stage 6-10	2628M56G01 For part serial numbers NOT listed in GENx-1B SB 72-0484, latest revision	17,000	17,000	15,000	15,000	14,600	12,200	14,600
Spool, Stage 6-10	2628M56G01 For part serial numbers listed in Table 1 of GENx- 1B SB 72-0484, latest revision	10,300	10,300	10,300	10,300	8,500	8,500	8,500
Spool, Stage 6-10	2628M56G01 For part serial numbers listed in Table 2 of GENx- 1B SB 72-0484, latest revision	5,700	5,700	5,700	5,700	4,800	4,800	4,800

(ii) For CDP seal P/N 2383M82P03, insert the information in Table 2 to paragraph (g)(1)(ii) of this AD.

**Table 2 to Paragraph (g)(1)(ii) – CDP Seal P/N 2383M82P03**

<b>Part Name</b>	<b>Part Number</b>	<b>Life Cycles -1B54/P2</b>	<b>Life Cycles -1B58/P2 -1B64/P2 -1B67/P2 -1B70/P2</b>	<b>Life Cycles -1B70C/P2</b>	<b>Life Cycles -1B70/72/P2 -1B70/75/P2 -1B74/75/P2 -1B75/P2</b>	<b>Life Cycles -1B76/P2</b>	<b>Life Cycles -1B76A/P2</b>	<b>Life Cycles -1B78/P2</b>
Seal, CDP	2383M82P03 For part serial numbers NOT listed in GENx-1B SB 72-0484, latest revision	20,000	20,000	15,000	15,000	15,000	15,000	15,000
Seal, CDP	2383M82P03 For part serial numbers listed in Table 3 of GENx-1B SB 72-0484, latest revision	6,100	6,100	6,100	6,100	5,300	5,300	5,300
Seal, CDP	2383M82P03 For part serial numbers listed in Table 4 of GENx-1B SB 72-0484, latest revision	13,400	13,400	13,400	13,400	9,300	9,300	9,300
Seal, CDP	2383M82P03 For part serial numbers listed in Table 5 of GENx-1B SB 72-0484, latest revision	3,600	3,600	3,600	3,600	2,900	2,900	2,900

(iii) For interstage seal P/N 2383M85P04, insert the information in Table 3 to paragraph (g)(1)(iii) of this AD.

**Table 3 to Paragraph (g)(1)(iii) – Interstage Seal P/N 2383M85P04**

<b>Part Name</b>	<b>Part Number</b>	<b>Life Cycles -1B54/P2</b>	<b>Life Cycles -1B58/P2 -1B64/P2 -1B67/P2 -1B70/P2</b>	<b>Life Cycles -1B70C/P2</b>	<b>Life Cycles -1B70/72/P2 -1B70/75/P2 -1B74/75/P2 -1B75/P2</b>	<b>Life Cycles -1B76/P2</b>	<b>Life Cycles -1B76A/P2</b>	<b>Life Cycles -1B78/P2</b>
Seal, Interstage	2383M85P04 For part serial numbers NOT listed in GENx-1B SB 72-0484, latest revision	17,000	15,000	15,000	15,000	14,200	14,800	14,200
Seal, Interstage	2383M85P04 For part serial numbers listed in Table 6 of GENx-1B SB 72-0484, latest revision	10,500	10,500	10,500	10,500	6,400	6,400	6,400



Part Name	Part Number	Life Cycles -1B54/P2	Life Cycles -1B58/P2 -1B64/P2 -1B67/P2 -1B70/P2	Life Cycles -1B70C/P2	Life Cycles -1B70/72/P2 -1B70/75/P2 -1B74/75/P2 -1B75/P2	Life Cycles -1B76/P2	Life Cycles -1B76A/P2	Life Cycles -1B78/P2
Seal, Interstage	2383M85P04 For part serial numbers listed in Table 7 of GENx-1B SB 72-0484, latest revision	15,000	15,000	15,000	15,000	10,500	10,500	10,500
Seal, Interstage	2383M85P04 For part serial numbers listed in Table 8 of GENx-1B SB 72-0484, latest revision	5,500	5,500	5,500	5,500	2,800	2,800	2,800

(iv) For HPT rotor stage 2 disk P/N 2383M86P02, insert the information in Table 4 to paragraph (g)(1)(iv) of this AD.

**Table 4 to Paragraph (g)(1)(iv) – HPT Rotor Stage 2 Disk P/N 2383M86P02**

Part Name	Part Number	Life Cycles -1B54/P2	Life Cycles -1B58/P2 -1B64/P2 -1B67/P2 -1B70/P2	Life Cycles -1B70C/P2	Life Cycles -1B70/72/P2 -1B70/75/P2 -1B74/75/P2 -1B75/P2	Life Cycles -1B76/P2	Life Cycles -1B76A/P2	Life Cycles -1B78/P2
Disk, Stage 2	2383M86P02 For part serial numbers NOT listed in GENx-1B SB 72-0484, latest revision	12,100	12,100	10,400	10,400	9,500	6,800	9,500
Disk, Stage 2	2383M86P02 For part serial numbers listed in Table 9 of GENx-1B SB 72-0484, latest revision	6,900	6,900	6,900	6,900	5,100	5,100	5,100
Disk, Stage 2	2383M86P02 For part serial numbers listed in Table 10 of GENx- 1B SB 72- 0484, latest revision	10,400	10,400	10,400	10,400	7,500	6,800	7,500
Disk, Stage 2	2383M86P02 For part serial numbers listed in Table 11 of GENx- 1B SB 72-	3,800	3,800	3,800	3,800	3,000	3,000	3,000

Part Name	Part Number	Life Cycles -1B54/P2	Life Cycles -1B58/P2	Life Cycles -1B70C/P2	Life Cycles -1B70/72/P2	Life Cycles -1B76/P2	Life Cycles -1B76A/P2	Life Cycles -1B78/P2
			-1B64/P2		-1B70/75/P2			
			-1B67/P2		-1B74/75/P2			
			-1B70/P2		-1B75/P2			
0484, latest revision								

(2) For all affected GENx-2B model turbofan engines, within 90 days after the effective date of this AD, revise the ALS of the existing GENx-2B EM and the operator's existing approved maintenance program or inspection program, as applicable, by inserting the following information into the applicable table for their respective part numbers:

(i) For stages 6-10 compressor rotor spool P/N 2628M56G01, insert the information in Table 5 to paragraph (g)(2)(i) of this AD.

**Table 5 to Paragraph (g)(2)(i) – Stages 6-10 Compressor Rotor Spool P/N 2628M56G01**

Part Name	Part Number	Life Cycles -2B67	Life Cycles -2B67B	Life Cycles -2B67/P
Spool, Stage 6-10	2628M56G01 For part serial numbers NOT listed in GENx-2B SB 72-0423, latest revision	-	-	11,100
Spool, Stage 6-10	2628M56G01 For part serial numbers listed in Table 1 of GENx-2B SB 72-0423, latest revision	-	-	10,300
Spool, Stage 6-10	2628M56G01 For part serial numbers listed in Table 2 of GENx-2B SB 72-0423, latest revision	-	-	5,700

(ii) For CDP seal P/N 2383M82P03, insert the information in Table 6 to paragraph (g)(2)(ii) of this AD.

**Table 6 to Paragraph (g)(2)(ii) – CDP Seal P/N 2383M82P03**

Part Name	Part Number	Life Cycles -2B67	Life Cycles -2B67B	Life Cycles -2B67/P
Seal, CDP	2383M82P03	-	-	15,000

<b>Part Name</b>	<b>Part Number</b>	<b>Life Cycles -2B67</b>	<b>Life Cycles -2B67B</b>	<b>Life Cycles -2B67/P</b>
	For part serial numbers NOT listed in GENx-2B SB 72-0423, latest revision			
Seal, CDP	2383M82P03 For part serial numbers listed in Table 3 of GENx-2B SB 72-0423, latest revision	-	-	6,100
Seal, CDP	2383M82P03 For part serial numbers listed in Table 4 of GENx-2B SB 72-0423, latest revision	-	-	13,400
Seal, CDP	2383M82P03 For part serial numbers listed in Table 5 of GENx-2B SB 72-0423, latest revision	-	-	3,600

(iii) For interstage seal P/N 2383M85P04, insert the information in Table 7 to paragraph (g)(2)(iii) of this AD.

**Table 7 to Paragraph (g)(2)(iii) – Interstage Seal P/N 2383M85P04**

<b>Part Name</b>	<b>Part Number</b>	<b>Life Cycles -2B67</b>	<b>Life Cycles -2B67B</b>	<b>Life Cycles -2B67/P</b>
Seal, Interstage	2383M85P04 For part serial numbers NOT listed in GENx-2B SB 72-0423, latest revision	-	-	15,000
Seal, Interstage	2383M85P04 For part serial numbers listed in Table 6 of GENx-2B SB 72-0423, latest revision	-	-	10,500
Seal, Interstage	2383M85P04 For part serial numbers listed in Table 7 of GENx-2B SB 72-	-	-	15,000

<b>Part Name</b>	<b>Part Number</b>	<b>Life Cycles -2B67</b>	<b>Life Cycles -2B67B</b>	<b>Life Cycles -2B67/P</b>
	0423, latest revision			
Seal, Interstage	2383M85P04 For part serial numbers listed in Table 8 of GENx-2B SB 72-0423, latest revision	-	-	5,500

(iv) For HPT rotor stage 2 disk P/N 2383M86P02, insert the information in Table 8 to paragraph (g)(2)(iv) of this AD.

**Table 8 to Paragraph (g)(2)(iv) – HPT Rotor Stage 2 Disk P/N 2383M86P02**

<b>Part Name</b>	<b>Part Number</b>	<b>Life Cycles -2B67</b>	<b>Life Cycles -2B67B</b>	<b>Life Cycles -2B67/P</b>
Disk, Stage 2	2383M86P02 For part serial numbers NOT listed in GENx-2B SB 72-0423, latest revision	-	-	13,300
Disk, Stage 2	2383M86P02 For part serial numbers listed in Table 9 of GENx-2B SB 72-0423, latest revision	-	-	6,900
Disk, Stage 2	2383M86P02 For part serial numbers listed in Table 10 of GENx-2B SB 72-0423, latest revision	-	-	10,400
Disk, Stage 2	2383M86P02 For part serial numbers listed in Table 11 of GENx-2B SB 72-0423, latest revision	-	-	3,800

(3) After performing the actions required by paragraphs (g)(1) and (2) of this AD, except as provided in paragraph (h) of this AD, no alternative life limits may be approved

for the affected parts.

**(h) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (i)(1) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(i) Related Information**

(1) For more information about this AD, contact Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7178; email: Alexei.T.Marqueen@faa.gov.

(2) For service information identified in this AD, contact General Electric Company, 1 Neumann Way, Cincinnati, OH, 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ae.ge.com; website: <https://www.ge.com>. You may view this referenced service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

Issued on May 12, 2022.

Gaetano A. Sciortino, Deputy Director for Strategic Initiatives,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

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